

AMENDMENTS TO THE CLAIMS

1-9 (Canceled)

10. (Previously Presented) A three-dimensional hydrogel structure micropatterned by a mold from which the hydrogel structure has been separated, the hydrogel structure comprising:

a polymer array of a hydrogel, the polymer array comprising a fluid that hydrates the polymer array and a second hydrogel comprising a second polymer array hydrated by a second fluid; and

a micropattern defining a surface of at least one hydrogel, the micropattern corresponding to an inverse micropattern transferred from a mold after separation of the mold from the hydrogels.

11-18 (Canceled)

19. (Previously Presented) A three-dimensional hydrogel structure micropatterned by a mold from which the hydrogel structure has been separated, the hydrogel structure comprising:

a polymer array of a hydrogel, the polymer array comprising a fluid that hydrates the polymer array, wherein the hydrogel is interfaced with a precursor of a second hydrogel comprising a second polymer array hydrated by a second fluid, whereby the precursor of the second hydrogel diffuses into the hydrogel interfaced therewith to adhere the hydrogels as the second hydrogel forms; and

a micropattern defining a surface of at least one hydrogel, the micropattern corresponding to an inverse micropattern transferred from a mold after separation of the mold from the hydrogels.

20. (Previously Presented) A three-dimensional hydrogel structure micropatterned by a mold from which the hydrogel structure has been separated, the hydrogel structure comprising:

a polymer array of a hydrogel, the polymer array comprising a fluid that hydrates the polymer array, wherein the hydrogel is interfaced with a second hydrogel comprising a second polymer array hydrated by a second fluid, whereby a destabilizer contacting the hydrogel and the second hydrogel conforms at least one of the hydrogels to adhere the interfaced hydrogels together when a concentration of the destabilizer is reduced; and

a micropattern defining a surface of at least one hydrogel, the micropattern corresponding to an inverse micropattern transferred from a mold after separation of the mold from the hydrogels.

21-23 (Canceled)

24. (Previously Presented) A three-dimensional hydrogel structure micropatterned by a mold from which the hydrogel structure has been separated, the hydrogel structure comprising:

a polymer array of a hydrogel, the polymer array comprising a fluid that hydrates the polymer array and a second hydrogel comprising a second polymer array hydrated by a second fluid, whereby precursors of the hydrogel and the second hydrogel were combined to interface the hydrogels as at least one hydrogel is formed; and

a micropattern defining a surface of at least one hydrogel, the micropattern corresponding to an inverse micropattern transferred from a mold after separation of the mold from the hydrogels.

25-30 (Canceled)

31. (Previously Presented) A method for micropatterning a three-dimensional hydrogel structure, the method comprising:

providing a mold, the mold comprising a micropatterned surface;

treating the micropatterned surface of the mold with a release agent;

forming a hydrogel from a precursor, wherein the precursor is in contact with the treated micropatterned surface of the mold while the hydrogel is formed, the hydrogel comprising a fluid that hydrates a polymer array and a second hydrogel comprising a second polymer array hydrated by a second fluid; and

separating the hydrogels from the treated micropatterned surface of the mold such that the mold transfers an inverse of a micropattern to a surface of at least one hydrogel.

32-38 (Canceled)

39. (Previously Presented) A method for micropatterning a three-dimensional hydrogel structure, the method comprising:

providing a mold, the mold comprising a micropatterned surface;

treating the micropatterned surface of the mold with a release agent;

forming a hydrogel from a precursor, wherein the precursor is in contact with the treated micropatterned surface of the mold while the hydrogel is formed, the hydrogel comprising a fluid that hydrates a polymer array;

interfacing the hydrogel with a precursor for a second hydrogel;

diffusing the precursor for the second hydrogel into the hydrogel interfaced therewith;

forming the second hydrogel to adhere the hydrogels; and

separating the hydrogels from the treated micropatterned surface of the mold such that the mold transfers an inverse of a micropattern to a surface of at least one hydrogel.

40. (Previously Presented) A method for micropatterning a three-dimensional hydrogel structure, the method comprising:

providing a mold, the mold comprising a micropatterned surface;

treating the micropatterned surface of the mold with a release agent;

forming a hydrogel from a precursor, wherein the precursor is in contact with the treated micropatterned surface of the mold while the hydrogel is formed, the hydrogel comprising a fluid that hydrates a polymer array;

interfacing the hydrogel with a second hydrogel;

conforming at least one of the interfaced hydrogels by contacting the hydrogels with a destabilizer;

reducing a concentration of the destabilizer to adhere the hydrogels together; and

separating the hydrogels from the treated micropatterned surface of the mold such that the mold transfers an inverse of a micropattern to a surface of at least one hydrogel.

41-43 (Canceled)

44. (Previously Presented) A method for micropatterning a three-dimensional hydrogel structure, the method comprising:

providing a mold, the mold comprising a micropatterned surface;

treating the micropatterned surface of the mold with a release agent;

combining a precursor for a hydrogel with a precursor for a second hydrogel;

forming the hydrogels from the precursors, wherein the precursors are in contact with the treated micropatterned surface of the mold while the hydrogels are formed; and

separating the hydrogels from the treated micropatterned surface of the mold such that the mold transfers an inverse of a micropattern to a surface of at least one hydrogel.

45-50 (Canceled)

51. (New) The three-dimensional hydrogel structure of claim 10, wherein:

the hydrogel comprises a cavity, whereby the cavity is formed by perturbing a portion of the second hydrogel;

the portion of the second hydrogel is perturbed by one of a change in temperature or an enzyme digesting the portion;

the mold substantially comprises silicon materials, poly (dimethylsiloxane) materials, photoresist materials, glass materials, plastic materials, rubber materials, synthetic materials, polymer materials, organic materials or any combination thereof;

the polymer array further comprises materials selected from the group consisting of biological components, organic components, metallic components, cellular components, synthetic components, intact cells, inorganic components and combinations thereof;

the cavity is contacted by flow of a liquid and the liquid comprises materials that are selected from the group consisting of biological components, organic components, metallic components, cellular components, synthetic components, intact cells, inorganic components and combinations thereof and further where the materials of the liquid adhere to a portion of the cavity; and

a portion of at least one hydrogel is interfaced with a substrate.

52. (New) The three-dimensional hydrogel structure of claim 19, wherein:

the hydrogel and second hydrogel form a network;

the network is contacted by flow of a liquid;

the liquid comprises materials that are selected from the group consisting of biological components, organic components, metallic components, cellular components, synthetic components, intact cells, inorganic components and combinations thereof;

the materials of the liquid adhere to a portion of the network; and

a portion of at least one hydrogel is interfaced with a substrate.

53. (New) The three-dimensional hydrogel structure of claim 20, wherein:

the destabilizer is selected from the group consisting of chaotropes, kosmotropes, urea, glucose, glycerol, guanidinium hydrogen chloride and combinations thereof;

the concentration of the destabilizer is reduced when a stabilizer contacts the hydrogels;

the destabilizer and the stabilizer are both selected from the group consisting of chaotropes, kosmotropes, urea, glucose, glycerol, guanidinium hydrogen chloride and combinations thereof;

the hydrogel and second hydrogel form a network;

the network is contacted by flow of a liquid;

the liquid comprises materials that are selected from the group consisting of biological components, organic components, metallic components, cellular components, synthetic

components, intact cells, inorganic components and combinations thereof;

the materials of the liquid adhere to a portion of the network; and

a portion of at least one hydrogel is interfaced with a substrate.

54. (New) The three-dimensional hydrogel structure of claim 24, wherein:

the precursor of the hydrogel or second hydrogel comprises a material selected from the group consisting of biological components, organic components, metallic components, cellular components, synthetic components, intact cells, inorganic components and combinations thereof.

55. (New) The method of claim 31, the method further comprising:

forming a cavity within the hydrogel by perturbing a portion of the second hydrogel and the portion of the second hydrogel is perturbed by a change in temperature or an enzyme digesting the portion;

the polymer array further comprises materials selected from the group consisting of biological components, organic components, metallic components, cellular components, synthetic components, intact cells, inorganic components and combinations thereof;

the method further comprising flowing a liquid through the cavity wherein the liquid comprises materials that are selected from the group consisting of biological components, organic components, metallic components, cellular components, synthetic components, intact cells, inorganic components and combinations thereof and wherein the materials of the liquid adhere to a portion of the cavity;

the method further comprising interfacing a portion of at least one hydrogel with a substrate.

56. (New) The method of claim 39 the method further comprising interfacing a portion of at least one hydrogel with a substrate.

57. (New) The method of claim 40, wherein:

the destabilizer is selected from the group consisting of chaotropes, kosmotropes, urea, glucose, glycerol, guanidinium hydrogen chloride and combinations thereof;

the concentration of the destabilizer is reduced when a stabilizer contacts the hydrogels;

the destabilizer and the stabilizer are selected from the group consisting of chaotropes, kosmotropes, urea, glucose, glycerol, guanidinium hydrogen chloride and combinations thereof; and

the hydrogel and second hydrogel form a network;

the network is contacted by flow of a liquid;

the liquid comprises materials that are selected from the group consisting of biological components, organic components, metallic components, cellular components, synthetic components, intact cells, inorganic components and combinations thereof;

the materials of the liquid adhere to a portion of the network; and

a portion of at least one hydrogel is interfaced with a substrate.

58. (New) The method of claim 44, wherein:

the precursor of the hydrogel or second hydrogel comprises a material selected from the group consisting of biological components, organic components, metallic



components, cellular components, synthetic components, intact cells, inorganic components and combinations thereof;

the hydrogel and second hydrogel form a network;

the method further comprising contacting the network with flow of a liquid;

the liquid comprises materials that are selected from the group consisting of biological components, organic components, metallic components, cellular components, synthetic components, intact cells, inorganic components and combinations thereof;

the materials of the liquid adhere to a portion of the network; and

the method further comprising interfacing a portion of at least one hydrogel with a substrate.